# PATENT SPECIFICATION

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DRAWINGS ATTACHED

1 290 530

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## (54) TELESCOPIC COLUMNS


(71) We, FRITZ BREMSHEY, WOLFGANG FULLING and HELMUT BREMSHEY, trading as BREMSHEY & Co., of 565 Solingen-Ohligs, Wilhelmstrasse 28, Germany, 565 Solingen-Ohligs, Hackauserstrasse 7, Germany, and 565 Solingen-Aufderhohe, Steinendorferstrasse 26, Germany, all of German nationality, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—


This invention relates to a telescopic column, for example, for swivel chairs, tables or the like, and of the kind having an internal clamp device which is operable by means of a control lever and has clamp linings situated at the end of a rod-like inner element, for example in the form of a spring cartridge, which shifts axially when the clamp is released.

In a design for columns of the kind referred to above known in Germany, the clamping action is produced because a spring-biased cone of a resilient element presses balls housed in a ball retainer onto the inner wall of the inner telescopic tube, this area of the inner telescopic tube being slotted to permit the necessary radial deflection. The tongues formed by the slots are provided on the outside with clamp linings which act on the inner wall of the outer telescopic tube. The slots, of course, weaken one end of the inner tube and also, such a design inhibits rotation of such columns, which is serious if they are for swivel chairs. The application of the large number of lining elements required for the slots is difficult during production, and the difficulties increase if the linings must be replaced due to wear.

An object of the invention is to provide a column of the kind referred to above such as to give a simple arrangement of the clamp element, possible also facilitating replacement, and a high braking efficiency in spite of small overall dimensions, without making the inner telescopic tube expansible due to slots or the like.


[*Price 25p*]


According to the present invention there is provided a telescopic column, having an internal clamp device, which is operable by means of a control lever and which has clamp linings situated at the end of a rod-like inner element, said inner element being movable axially when the clamp device is released, the clamp linings being formed by a cylindrical clamp element positively engaging the inner element and having a wall at a free end thereof projecting into a gap between two telescopic tubes of the column, such that the outer surface of the clamp element bears on the inner wall of the outer telescopic tube and the inner surface of the clamp element, which tapers towards the free end, bears on a frustoconical outer wall of the inner telescopic tube.

According to a preferred embodiment of the invention, the positive engagement between the clamp element and the inner element is formed as a result of an inwardly projecting annular shoulder at one end of the clamp element, this shoulder engaging in an annular groove in the outer element of the inner element which is preferably a spring-cartridge, specially a gas spring cartridge.

Preferably, the wall of the clamp element is interrupted by longitudinal slots which are open towards the end of the clamp element associated with the shoulder and extend over only part of the length of the clamp element.

Advantageously, also, the portions of wall between the slots contain oblique grooves. Furthermore, the clamp element preferably has outwardly projecting oil wiper lips at one or both ends. It is then advantageous if that portion of the wall of the clamp element situated between the two telescopic tubes forms inwardly projecting lugs which project into longitudinal slots in

the inner telescopic tube and are displaceable in this tube.

Advantageously, the clamp element consists of at least two portions which can be folded relative to one another about the longitudinal axis of the clamp element.

It is an advantage if spacing of the two telescopic tubes is effected by means of a sleeve disposed on the cover tube and forming two rings which extend from a common base, and the free end of the outer telescopic tube extends into the annular gap between these rings. This gives an extremely advantageous telescopic column of the type described, suitable more particularly for swivel chairs, tables or the like and remarkable for its uncomplicated construction.

The clamp element itself is a continuous, readily positioned structural unit, which preferably consists of at least two portions which can be folded relative to one another about a longitudinal axis, and therefore can be merely put round the end of the inner telescopic tube. The positive engagement makes fixing elements generally superfluous. The clamping effect is due to the frustoconical shape between the end of the inner telescopic tube and the clamp element, and this effect is easily cancelled to permit adjustment of the column height. Accordingly, only slight lever movements requiring little force are needed. Radial expansibility of the clamp element is provided very simply by means of slots in this element, which extend in the longitudinal direction and over only part of the length of the clamp element. Those wall portions between the slots in the clamp element contain oblique grooves, which channel away any lubricating oil present. The same purpose is served by the outwardly projecting oil wiper lips provided in accordance with the invention at both ends of the clamp element. The provision of a sleeve for spacing the two telescopic tubes gives the desired ease of rotation. The tolerances required in connection with the telescopic tubes are no longer so narrow. The inner wall forming the annular gap combines with the lugs and longitudinal slots to form a stop for the upper, inwardly sloping, annular end face of the clamp element. The inner telescopic tube is prevented from extending beyond the permissible stroke as a result of additional traction applied from outside.

In a column according to the invention, in order to simplify assembly, maintenance of the clamp element and central mounting of the clamp element, it is an advantage if the control lever is mounted in a cap surmounting the end of the gas spring cartridge and held in one telescopic tube, preferably by means of a snap fit, which cap contains an outlet slot for the control lever, of which the inner portion at the cap end is guided in a slot in a partition in the cap and has an outwardly directed retaining boss.

As regards the releasing of the inner element (gas spring cartridge), the rocking control lever can be mounted outside the telescopic column. To this end, however, the extending telescopic element must have a bearing bracket for the rocking lever, either on the tube element itself or beneath the baseplate for the seat. Apart from the manufacturing cost, which is considerable in the case of mass-produced articles such as chairs, tables or the like, later repair or replacement of the inner element (gas spring cartridge) is only possible after the axial split pin has been removed, usually by knocking it out. This is troublesome, time-consuming and expensive.

According to a preferred embodiment of the invention, the cap wall embraces the end of the gas spring cartridge and the cap wall is is preferably provided with longitudinal slots for radial resilience, whilst those portions of the cap wall adjoining the exit slot for the control lever are advantageously thicker. It is also an advantage if the cap end is extended by a central pin.

Finally, an advantageous feature of a preferred embodiment of the invention is that the lower edge of the cap has inwardly inclined bevelled portions. The cap so constructed acts as a fixing element for the control lever. The lever is merely passed through the lateral slot, whereupon the cap is put on. A kind of self-fixing mechanism results. Because of the boss on the control lever, the outlet slot in the cap prevents this lever from being pulled out. The additional slot in the partition inside the cap provides guided alignment of the control lever, so that the latter is always ready for use. If the cap is held simply by a snap connection, assembly can be carried out without retaining means and possibly without any tools, since, because of the novel arrangement of the control lever, the customary axial split pin is omitted. The cap also acts as a spacer and sliding sleeve. The radial resilience required for its application is provided by means of additional slots. The bevelling of the lower edge of the cap, also facilitates application of the cap. The reinforcing of the slot through which the control lever passes is a simple way of discouraging premature wear. The pin on the end of the cap can be used as a grip when the cap is applied. This pin, or a perforation, facilitates removal of the cap if dismantling becomes necessary. The novel arrangement also has aesthetic advantages, since no bearing brackets are required. The bearing element for the cart-

ridge simultaneously acts as bearing for the lever.

For a better understanding of the invention and to show how the same may be put into effect, reference will now be made, by way of example, to the accompanying drawings, in which:—

Figure 1 shows a side view of a telescopic column according to the invention, partly in section.

Figure 2 shows a longitudinal sectional view of the clamp element of the column of Figure 1,

Figure 3 shows a section along the line III—III of Figure 2.

Figure 4 shows a side view, partly in section, of part of the clamp element of Figure 2, with the upper end broken away to show the oil wiper lips.

Figure 5 shows a side view of the clamp element of Figure 2,

Figure 6 shows a sectional view of the cap of the telescopic column of Figure 1,

Figure 7 shows a view of the cap of Figure 6 from below,

Figure 8 shows a partial sectional view of the cap of Figure 6,

Figure 9 shows a side view of the control lever of the telescopic column of Figure 1, and

Figure 10 shows a top view of the control lever of Figure 9.

Referring now to the drawings, the column in this case for a swivel chair, comprises an inner telescopic tube 1 and an outer telescopic tube 2. The outer tube 2 is supported in a sleeve 3 of a pedestal 4 of the swivel chair.

The lower edge of the sleeve 3 is turned inwardly, providing a suitable support for a disc 5 whose upwardly extending edge $5^1$ forms a spacer ring between the outer tube 2 and the sleeve 3. The sleeve 3 forms the cover tube for the two telescopic tubes 1 and 2. The telescopic tubes 1 and 2 are spaced by means of a sleeve 6, mounted on the sleeve 3 (see Figure 1) and having two rings $6^1$, $6^{11}$ extending from a common base. The ring $6^1$ lies between the sleeve 3 and the outer telescopic tube 2, the ring $6^{11}$ between the outer telescopic tube 2 and the inner telescopic tube 1. The free upper end of the outer tube 2, which is also the tube capable of rotation, therefore enters annular gap $6^{111}$ formed between the rings $6^1$, $6^{11}$.

Inside the inner telescopic tube 1 lies a rod-like inner element 7, which is preferably a spring cartridge, more particularly a gas spring cartridge, which acts as a force storage means. At the bottom, the element 7 is supported by a piston rod $7^1$ on a plate 8, which bears on a shoulder 9 formed by an in-turned edge of the inner telescopic tube 1. Outer element $7^{11}$ of the element 7 is movable relative to the piston rod $7^1$ and is connected to a cylindrical clamp element 10 coupled to the outer element $7^{11}$. The clamp element is entrained as a result of positive engagement with the outer element $7^{11}$, this engagement being due to the inwardly projecting annular shoulder 11 on one end of the clamp element 10. This shoulder 11 enters an annular groove 12 in the outer element $7^{11}$ of the element 7.

As shown in Figure 1, the wall of the clamp element 10 extends into the gap between the outer and inner telescopic tubes 1 and 2 of the column, in such a way that the outer surface $10^1$ of the clamp element 10 bears on the inner wall $2^1$ of the outer telescopic tube 2 and the inner surface $10^{11}$ of the clamp element 10, which surface $10^{11}$ tapers towards the free end, bears on frustoconical outer wall $1^1$ of the inner telescopic tube 1.

Lugs 13, 14 on the clamp element 10 enter longitudinal slots 15, 16 in the inner telescopic tube 1 with sufficient clearance in the axial direction not to interfere with clamping and releasing. The lugs 13, 14 are directed inwardly and serve to prevent the inner telescopic tube 1 from being pulled out when its upper limit position is reached.

The clamp element 10 may consist of two or more components which can be folded relative to one another about the longitudinal axis of the clamp element. The hinge for folding is suitably a strip 17 of material left during manufacture. The strip 17 is in the upper portion of the clamp element, which is subjected to less stress under radial expansion than the lower portion thereof. It occupies only part of the thickness of the clamp element wall and ends at the periphery of the clamp element.

That portion of the clamp element involved in radial expansion contains longitudinal slots 18 which are open at the ends nearer the shoulder 12 and extend over only part $x$ of the length $y$ of the clamp element. The width Z of the slots 18 in the central portion of the clamp element is greater than their width $Z^1$ at the shoulder end. Upper end $18^1$ of each slot is rounded, the transition between the slot 18 and its narrower portion at $18^{11}$ being also rounded. Recesses 19 extend between the slots 18 on the shoulder end of the clamp element, but the recesses 19 do not go further than that part of the wall, which because the clamp element is conical, is thicker.

The wall portions formed in the outer surface $10^1$ of the clamp element by the slots 18 contain oblique grooves 20. The grooves 20 channel away any lubricants present around each slot 18. The clamp ele-

ment also has outwardly projecting oil wiper lips 21, 22 at its two ends. In order to make the lower oil wiper lip 22, in particular, especially flexible, the lower end face 23 of the clamp element contains an annular depression (see Figure 2).

The column of the swivel chair is equipped with a control lever 25 for adjusting its height. The lever 25 projects sideways just below a baseplate 24 for a seat. The baseplate 24 is rigidly connected to the extensible inner telescopic tube 1 by a tubular insert 26. The double-walled zone so formed contains a slot-like passage $26^{1}$ for the control lever 25, which lever 25 is supported in a cap 27 which covers the end of the element 7. The cap 27 is mounted on the inner tube 1 by means of a snap fit, a projection 28 integral with the cap 27 engages a corresponding retaining recess in the tube 1.

The cap 27 contains an exit slot 29 for the control lever 25, and on its inner portion at the cap end, the slot 29 is guided in a slot 30 formed in a partition 31 inside the cap 27. Portion A of the lever 25 between the two slots 29 and 30 bears a retaining boss 32, produced by deformation of the cap during manufacture. The boss 32 prevents the lever 25 from detaching itself.

As shown in Figure 9, the lever 25 is cutaway at 33 outside the boss 32 and on the opposite side of the boss 32 there is a rising lever edge $25^{1}$. These two features provide the necessary ease of pivoting whereas the pivot bearing for the control lever 25 is formed by upper edge $26^{11}$ of slot-like passage $26^{1}$ (see Figure 1).

If the control lever 25 is pivoted in the direction of the arrow *a* (see Figure 1), that end of the element 7, which extends into the cap 27 and which acts as a double lever, loads the control lever 25, thereby overcoming the clamping action of the clamp element 10. The pressure or forces stored in the element 7 move(s) the inner telescopic tube 1 continuously upwardly. This movement is interrupted as soon as the control lever 25 is released. End face 40 of the clamp element 10 abuts on the ring element $6^{11}$, in the most upwardly position thereof. Wall $27^{1}$ of the cap 27 embraces end $7^{111}$ of the element 7, forming a spacer ring between the element 7 and the inner tube 1, so centring the element 7. To facilitate application of the cap 27 onto the element 7, the wall $27^{1}$ of the cap contains two additional longitudinal slots 34, 35. The same end is served by an inwardly sloping bevelled portion 37 on the end 36 of the cap. The longitudinal slots 34, 35 and the passage $26^{1}$ end shortly before conically tapering cap end $27^{11}$ of the cap 27. Their angular spacing relative to one another is approximately uniform, whilst the portions of the cap wall near the outlet slot are thicker (see Figure 3). The cap end is extended by a central pin 38, which can serve as a grip and a hole 39, into which an extractor hook may be inserted, is provided to facilitate removal of the cap 27.

Application of the cap 27 fixes the control lever permanently to the column in a guided fashion and in such a way that it can be operated immediately.

## WHAT WE CLAIM IS:—

1. A telescopic column, having an internal clamp device, which is operable by means of a control lever and which has clamp linings situated at the end of a rod-like inner element, said inner element being movable axially when the clamp device is released, the clamp linings being formed by a cylindrical clamp element positively engaging the inner element and having a wall at a free end thereof projecting into a gap between two telescopic tubes of the column, such that the outer surface of the clamp element bears on the inner wall of the outer telescopic tube and the inner surface of the clamp element, which tapers towards the free end, bears on a frustoconical outer wall of the inner telescopic tube.

2. A column according to Claim 1, wherein the positive engagement between the clamp element and the inner element is formed as a result of an inwardly projecting annular shoulder at one end of the clamp element, this shoulder engaging in an annular groove in the outer element of the inner element.

3. A column according to Claim 1 or 2, wherein the wall of the clamp element is interrupted by longitudinal slots which are open towards the end of the clamp element associated with the shoulder and extend over only part of the length of the clamp element.

4. A column according to Claim 3, wherein the portions of wall between the slots contain oblique grooves.

5. A column according to any one of the preceding claims, wherein the clamp element has outwardly projecting oil wiper lips at each or both ends.

6. A column according to any one of the preceding claims, wherein the portion of the wall of the clamp element situated between the two telescopic tubes forms inwardly projecting lugs which project into longitudinal slots in the inner telescopic tube and are displaceable in this tube.

7. A column according to any one of the preceding claims, wherein the clamp element comprises at least two portions which can be folded relative to one another about

the longitudinal axis of the clamp element.

8. A column according to any one of the preceding claims, wherein spacing of the two telescopic tubes is effected by means of a sleeve disposed on a cover tube and forming two rings which extend from a common base, the free end of the outer telescopic tube extending into the annular gap between said rings.

9. A column according to any one of Claims 1 to 8, wherein the inner element is a spring cartridge.

10. A column according to Claim 9, wherein the inner element is a gas spring cartridge.

11. A telescopic column, substantially as hereinbefore described with reference to, and as shown in, Figures 1 to 5 of the accompanying drawings.

12. A telescopic column in accordance with Claim 1, which further comprises a control lever mounted in a cap surmounting an end of the inner element and held in one telescopic tube, which cap contains a slot for passage of the control lever, of which the inner portion at the cap end is guided in a slot in a partition in the cap and has an outwardly directed retaining boss.

13. A column according to Claim 12, wherein a cap wall embraces the said end of the inner element.

14. A column according to Claim 13, wherein a or the cap wall is provided with longitudinal slots to provide a radial resilience.

15. A column according to Claim 13 or 14, wherein the portions of a or the cap wall adjoining the exit slot for the control lever are thicker than the other portions of the cap wall.

16. A column according to Claim 12, 13, 14 or 15, wherein the cap end is extended by a central pin.

17. A column according to any one of Claims 12 to 16, wherein a lower edge of the cap has inwardly inclined bevelled portions.

18. A column according to any one of Claims 12 to 17, wherein the cap is held in said one telescopic tube by means of a snap fit.

19. A column according to any one of Claims 12 to 18, wherein the inner element is a spring cartridge.

20. A column according to Claim 19, wherein the inner element is a gas spring cartridge.

21. A telescopic column, substantially as hereinbefore described with reference to, and as shown in, Figures 1 to 10.

22. A swivel chair or table comprising a telescopic column as claimed in any one of the preceding claims.

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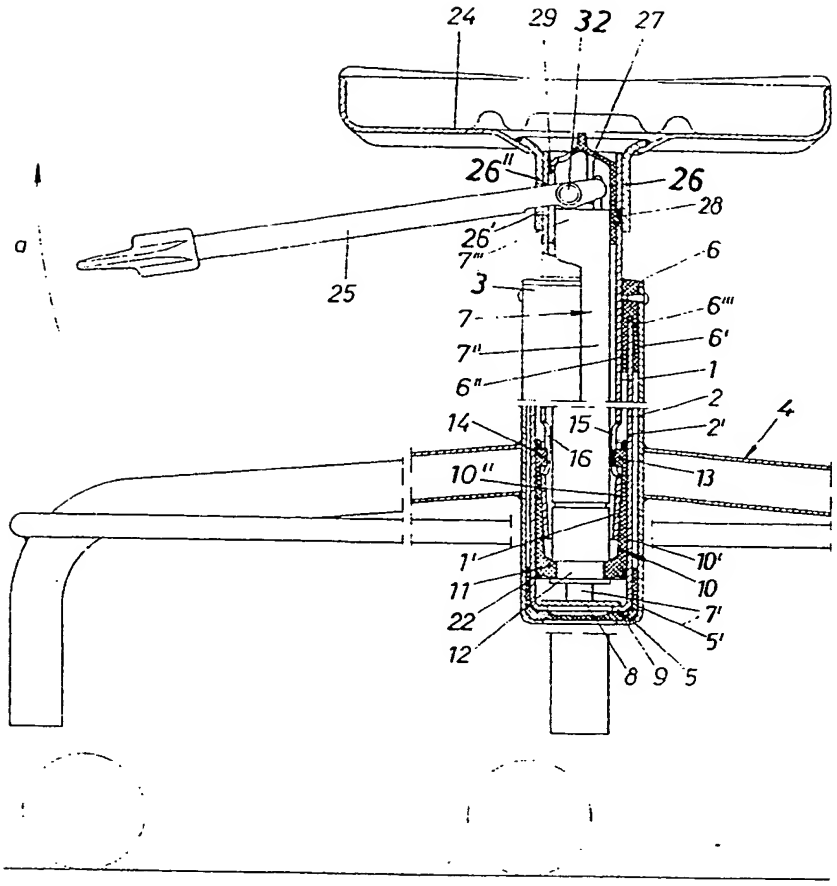
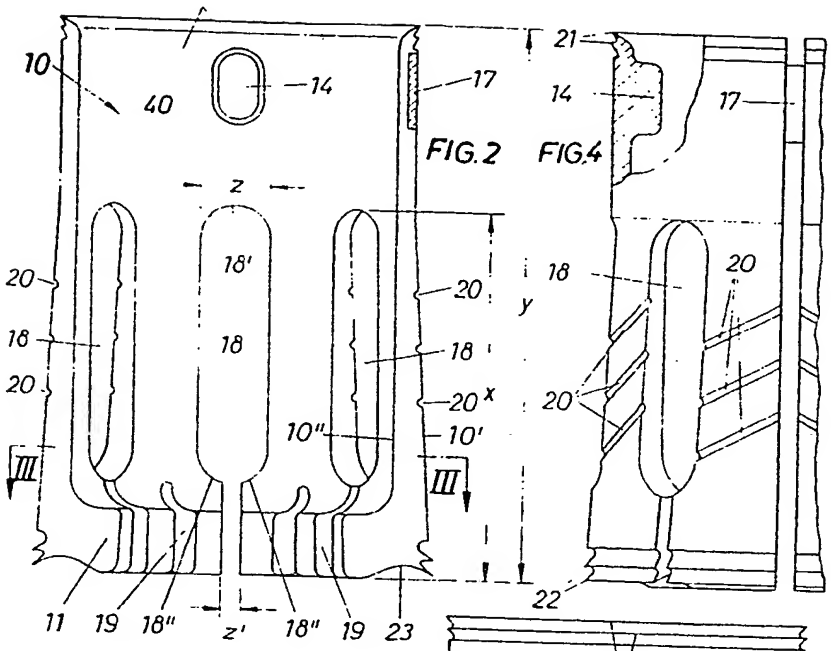
1290530 COMPLETE SPECIFICATION
3 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 1

FIG. 1




10
40
14
17
z
18'
18
20
18
20
10"
III
11
19
18"
z'
18"
19
23
FIG. 2
21
14
17
18
20
20
20
22
FIG. 4

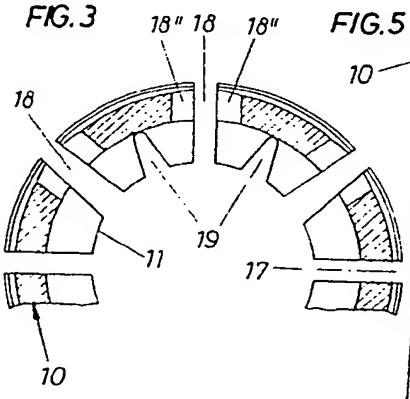


FIG. 3
18"
18
18"
18
19
11
17
10

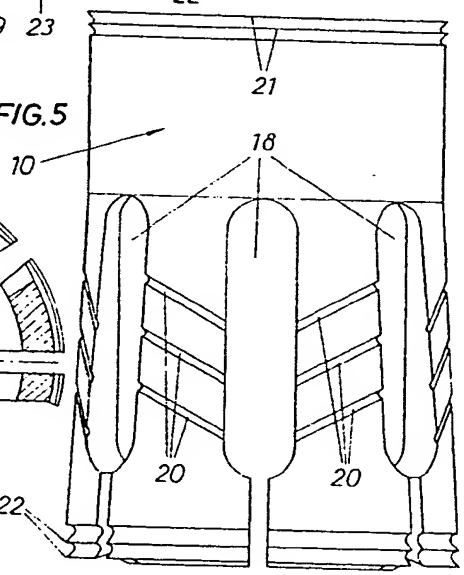


FIG. 5
21
10
18
20
20
22

FIG.7

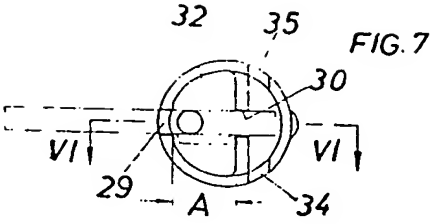



FIG.6

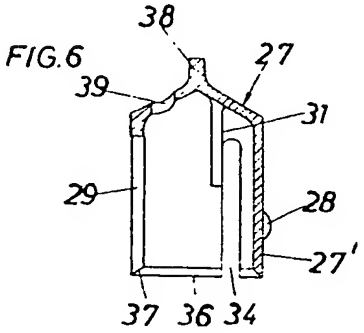



FIG.8

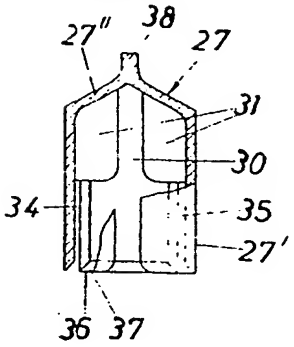



FIG.9

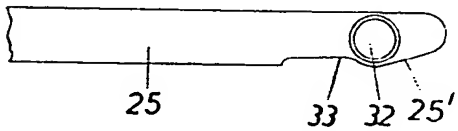



FIG.10